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ABSTRACT

This report describes the progress and plans of the Scottish Microelectronics Development Programme (SMDP), which was created to stimulate the development of microcomputer software and the use of microcomputers in both curriculum and management through the loan of hardware to a selected group of projects based in schools and colleges. Included are brief descriptions of Phase 1 (1979-1980), which provided support for 68 projects and established a national hardware and software center at the SMDP base in Glasgow, and Phase 2, which emphasizes the development of educational software; a calendar of implementation to March 1981; a listing of staff and advisors; the 10 program objectives; 18 strategy statements and four operational statements; and an overview of completed, current, and proposed implementation of each of the 18 strategies with references to the projects associated with each. Appended materials contain a description of the SMDP information service; a tabular listing including the institution, project leader, microcomputer system, and subject areas of each of the 68 projects; reports on the School's Computer Administration and Management Project (SCAMP) and the Scottish Community Education Microelectronics Project (SEMP); and overviews of the monitoring and evaluation of projects and the programmer's involvement with working groups. (LMM)

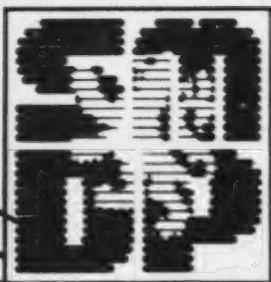
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SCOTTISH MICROELECTRONICS DEVELOPMENT PROGRAMME

ED231327

STRATEGY AND IMPLEMENTATION PAPER



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Strategy and Implementation Paper

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1. Introduction

The microelectronics scene in Scotland is truly dynamic. In November 1979 there were just over 100 microcomputer systems in Scottish schools. Today, 17 months later, there are over 400. Two Regions have gone from a nominal involvement to 100% coverage of their secondary schools and the Scottish Microelectronics Development Programme (SMDP) has given on loan more than 100 systems to schools and colleges.

The major Scottish Education Department (SED) initiatives in microelectronics began in 1979 when the basic policies were determined and these have been modified, from time to time, to take into account educational and technological developments. A key feature of SED policy was the establishment of SMDP which is, in effect, a pump priming agency stimulating developments in a selected group of projects based in schools and colleges. However, with its present resources, SMDP cannot provide services to establishments outside this group except on a very limited basis.

SMDP was officially opened by Mr Alex Fletcher, MP, Minister responsible for Industry and Education, on Monday 2nd February, 1981. He toured the display area, visited the Information Service and then, in his address, stressed the importance of microelectronics and the need for education and industry to co-operate in training and applications.

The purpose of this paper is to act as a working document for the steering committee and to inform those involved with and interested in SMDP of its progress and plans. It includes statements on strategy and implementation but, because of the considerable amount of work already underway, the latter is divided into three categories: completed, current and proposed.

David D Walker
Director, SMDP
6th April, 1981

2. **SMDP Phase 1 and Phase 2**

In reading this paper it is important to distinguish between the two phases of the Scottish Microelectronics Development Programme, Phase 1 of which was completed in 1980.

2.1 **Phase 1**

In 1979 SED funded a microcomputer programme in Scotland which is now referred to as Phase 1 of SMDP.

Educational establishments in Scotland were invited to submit proposals for microelectronics projects under which hardware would be supplied on loan by SMDP and staff and accommodation would be supplied by the school or college. It was also a condition of the loan that any software produced would be on open access throughout Scottish education.

The programme had £320,000 available but was heavily oversubscribed with bids totalling over £2,000,000 being received. This overwhelming response resulted in many worthwhile projects not being supported and many others receiving less than had been originally requested. These SMDP projects cover almost all subjects taught in schools and colleges, from the expected Mathematics, Science and Engineering through important applications in Geography, Home Economics, Farm Management and Business Studies to the less obvious Social Subjects and to Careers Guidance. Several projects are exploring uses in remedial and special education, including applications for deaf and for blind children. Other projects concentrate on educational management and administration.

The total number of projects is 68, some involving more than one establishment. The project centres are distributed throughout Scotland, from the Orkneys in the north to the border country in the south, and from the island of Skye in the west to Aberdeen in the east. Through this programme, SMDP established centres for educational software development and for investigating the possible effects of microelectronics in various subject areas.

A national hardware and software centre was established at the SMDP base in Glasgow. It contains most of the microcomputer systems in use in schools and colleges and is available for use by educationists and industrialists.

2.2 **Phase 2**

In April 1980 the Scottish Minister responsible for Industry and Education, Mr Alex Fletcher, MP, announced in parliament the establishment of a £1,000,000 research and development programme over 4 years as an extension of the original Phase 1 initiative. This programme is now known as Phase 2 of SMDP.

The SMDP staff includes a Director, Depute Director, Executive Coordinator and Information Officer and will have up to 10 programmers with technical and secretarial support. The steering group for the Programme consists of representatives of SED, the Convention of Scottish Local Authorities (COSLA) and the Scottish Council for Educational Technology (SCET). An independent evaluator, from the Department of Education, University of Edinburgh, has also been appointed. The Programme makes extensive use of advisers and consultants. It is expected that most of the original 68 projects will continue to be supported in Phase 2. In addition some have been selected for future development by enhancing the hardware and programming support. Such projects are called Phase 2 development centres.

The emphasis of Phase 2 is on the development of educational software. A software library is being set up on a two-tier basis. The lower level will contain donated programs which will be available to anyone in Scottish education but which will not be guaranteed by SMDP. The upper level will consist of programs, developed or purchased, which are considered to be educationally valuable, adequately documented and technically competent. It is hoped that this facility will result in links being established for software exchange with other countries within the United Kingdom and abroad.

The SMDP periodical and newsletter is called Phase Two and is published quarterly in February, May, August and November. It provides detailed information about SMDP, with regular profiles of individual projects, news of developments in hardware and software and a calendar of forthcoming events. The first issue was published early in 1981.

2.3 Priorities for Resource Allocation in Phase 2

The principal recipients of additional SMDP resources under Phase 2 are the Phase 2 development centres. SMDP will normally continue its current level of support throughout Phase 2 to the centres established under Phase 1. Support for other establishments will only be given if time and resources are available after SMDP has fulfilled its responsibilities to Phase 1 and Phase 2 centres.

If an establishment or authority wishes to be more closely associated with SMDP mainstream activities it may do so, subject to negotiations on the resources to be supplied by the establishment or authority.

In order that schools and colleges, outwith Phase 1 and Phase 2 centres, may have access to SMDP information and software resources, an information network will be set up through selected colleges and Regional resource centres. This network will link up with the Microelectronics in Education Programme (MEP), which is the programme for the rest of the United Kingdom (England, Wales and Northern Ireland).

3. *Calendar of Implementation to March 1981*

Sept	1979	—	Survey of microcomputers in Scottish schools and colleges. Phase 1 of SMDP funded by SED.
Oct			
Nov		—	Part-time Director seconded. £320,000 of micro-
Dec			computer systems allocated and installed in 68
Jan	1980		project centres, involving over 90 schools and
Feb			colleges throughout Scotland. Over 100 micro-
Mar			computer systems operating under Phase 1.
Apr			Approximately 200 teachers and lecturers
May			associated with the projects. Educational
June			software projects underway in most curricular
July			areas.
Aug			
Sept			
Oct		—	Further SED funding to implement Phase 2 of SMDP.
Nov		—	Full-time Director, Depute and back-up staff ap-
Dec			pointed. Hardware maintenance service implemented.
Jan	1981		Phase 2 development centres identified for further
Feb			hardware, software and programming support. Approx-
Mar			imately 150 microcomputer systems operating under
		—	SMDP. SMDP formally opened by Minister.

4. SMDP Staffing and Advisory Staff

The Director of SMDP is David D. Walker. He was originally seconded by SED from Tayside in September 1979 to carry out a survey of microcomputer systems in Scottish schools and colleges. In November 1979 he was seconded to direct Phase 1 of SMDP and was appointed full-time Director in October 1980.

SMDP Full-time Staff Complement:

Director	Maintenance Technician
Depute Director	Two Secretaries
Executive Co-ordinator	Three Senior Programmers
Information Officer	Seven Programmers

SMDP Steering Group:

J. G. Morris, HMCI (Chairman)
W. Beveridge, HMI
I. Halliday (representing SCET), Depute Director of Education, Strathclyde Region
D. McNeill (representing COSLA), Depute Director of Education, Fife Region
M. Roebuck, HMI
Professor D. Sharp (representing SCET), Department of Chemistry, University of Glasgow

Independent Evaluator:

P. Odor, Godfrey Thomson Unit, Department of Education, University of Edinburgh

Liaison with SED:

F. H. Johnston
T. McFadden

Observers:

N. Curley, Department of Education and Science
R. McLuskie, Director of SCET
I. Watt, Scottish Education Department

Project Advisers:

Professor R. Burnside, Department of Mathematics and Computing, Paisley College of Technology
Dr. J. Howe, Head of Department of Artificial Intelligence, University of Edinburgh
I. Miller, Director of Computer Services, Paisley College of Technology
D. Ord, Director of Computer Services, Dundee College of Technology

Hardware and Software Consultants:

B. Taylor, Curriculum Development Officer, Fife Region
C. Tomasso, Co-ordinator of Secondary Schools Computer Administration and Management Project (SCAMP)

5. Objectives

The following objectives refer to activities associated with Phase 1 centres, Phase 2 development centres and the SMDP information service.

- 5.1 the promotion within SMDP Phase 1 and Phase 2 centres of general awareness of the implications of microelectronics among pupils, students and staff;
- 5.2 the production of materials and the provision of practical experience within SMDP Phase 1 and Phase 2 centres for those who will conduct teacher's pre-service and in-service courses in the application of microelectronics in various subjects;
- 5.3 the use of microcomputers in a curriculum context within SMDP Phase 1 and Phase 2 centres for learning and for assessment purposes;
- 5.4 the production of curricular materials within SMDP Phase 1 and Phase 2 centres to enable pupils/students to learn about and gain experience in the use of microcomputers;
- 5.5 the exploitation of microelectronics within SMDP Phase 1 and Phase 2 centres to assist pupils/students with special educational needs, particularly those suffering from sensory loss; and
- 5.6 the application of microcomputers to management in school and post-school education within SMDP Phase 1 and Phase 2 centres.

These initial objectives have been supplemented by a further four because of developments since 1979.

- 5.7 the application of microcomputers to community education and for general awareness in association with the Scottish Community Education Council;
- 5.8 the development of ways and means of promoting joint industry and education microelectronics projects in association with MEDC*;
- 5.9 the development of a central software and information service in association with selected colleges and regional authorities; and
- 5.10 the dissemination, collection and exchange of information with other agencies and projects in the UK and abroad.

* The Microelectronic Educational Development Centre (MEDC) is based on Paisley College of Technology and has a remit to encourage microelectronics courses in further and higher education and to ensure an adequate supply of manpower for Scottish industry in this field.

6. Strategy Statements

6.1 Promotion of general awareness

To promote general awareness within SMDP Phase 1 and Phase 2 centres, SMDP will become involved in the co-ordination of working groups and in the presentation and dissemination of software and other educational material associated with, for example:

- microcomputers as data base and information processors for general purpose and community use
- microcomputers simulations
- the use of microelectronics in industry and commerce
- the application of special purpose peripherals
- microelectronics control and recording devices
- microcomputer to microcomputer interfacing

6.2 Material for pre- and in-service teacher training courses

SMDP will provide resources to back up teacher workshops and working groups at Regional and National level which are associated with Phase 1 and Phase 2 centres and will assist with the development and dissemination of appropriate pre- and in-service training modules. For example, SMDP will offer a loan service for software and hardware and provide programming support and information services. SMDP will also equip a van to give mobile support to in-service education and community awareness activities.

Success in the production of in-service course materials will largely depend upon the active co-operation of Regional resource centres and the colleges of education.

6.3 Computer Assisted Learning (CAL)

SMDP will assist with the development, evaluation and distribution of CAL material associated with SMDP projects and will endeavour to acquire materials from commercial sources and from educational institutions including the former International Centre for the Use of Computers in Secondary Education. Assistance may take the form of access to CAL material, programming support, in-house facilities and information services.

6.4 Computer assisted assessment

SMDP will give programming help to selected Phase 2 development centres and will assist them by supplying information and developed software.

6.5 Microcomputer applications in industry and commerce

SMDP will acquire packages including payroll, inventory, financial control and industrial and commercial simulations and will assist working groups to develop and distribute modules based on these packages.

6.6 Microelectronics for special education

SMDP will assist in setting up a small working group of specialist teachers and advisers associated with the teaching of pupils with sensory loss. Programming assistance will be provided and, where appropriate, commercial software. Outside agencies will be encouraged to support the working group which will be publicised by the information service.

6.7 School and post-school management

SMDP will support and publicise the Secondary Schools Computer Administration and Management Project (SCAMP) as the principal school administration project in Scotland and give regular publicity to applications in school management. A group will be formed to evaluate DBMS, word processing and file handling techniques. SMDP will continue to support and co-ordinate the other Phase 1 administration projects.

6.8 Community education and awareness

SMDP, in association with other interested parties, will develop and promote general interest courses for the community.

6.9 Industrial liaison

SMDP will be involved in joint industrial projects carried out in co-operation with MEDC at Paisley and others. The Programme will concentrate on the use of microelectronics systems in commercial and industrial applications and their use in staff training. Joint projects may include seminars, hardware evaluation, workshops, software design, simulations, industry in-house courses open to teachers, industry-funded liaison officers and programmers.

6.10 Dissemination, collection and exchange of general information

An information service largely for Phase 1 and Phase 2 centres will be provided through the activities of the Information Officer and other SMDP staff where appropriate. Enquiries will be handled by post, telephone and personal visits and will involve technical and educational information on hardware, software and educational support material. The service will acquire and disseminate information from the United Kingdom and abroad. SMDP will participate in an appropriate United Kingdom information network.

6.11 Software from project sources

All software packages developed at Phase 1 and Phase 2 centres will be collected and housed in the software library. The material will be tested and evaluated by other centres or working groups. All such material will be on open access within Scottish education. The principle that software generated in Scotland should be free to Scottish schools and colleges has been confirmed by the Convention of Scottish Local Authorities (COSLA). The only costs or parts thereof which should be passed on will be those associated with the production and distribution of documentation and storage media.

6.12 Software from other sources

Where SMDP has incurred costs in acquiring software, such costs may have to be passed in whole or in part to a receiving centre.

6.13 Software library

SMDP will establish a central library of software. This library will include two basic software levels. The upper level will consist of packages considered to be educationally valuable, adequately documented and technically competent. These programs will be maintained by SMDP in association with the program authors. The lower level library will consist of contributed programs for which no guarantee will be given. Some lower level packages, after evaluation by a subject group, may be selected for further development with a view to inclusion in the upper level. Both library levels may include software which has incurred acquisition or other costs.

6.14 Display area

The SMDP display area will serve two functions; it will provide workstations for the programmers and a display area for visitors. It will show, among others, the microcomputers currently associated with the projects, and will also include a number of the peripherals currently being used in education. A small area will be set aside for physics and engineering control techniques. Anyone from schools, colleges, industry or elsewhere, interested in seeing the display area will be able to telephone to make an appointment.

6.15 SMDP periodical (Phase Two)

Phase Two will be the quarterly periodical of SMDP and will include profiles of projects and project centres. It will also carry items of general interest to those involved in educational computing in Scotland. Space in the periodical may be offered to other interested parties. The periodical will be on subscription but project centres will receive free copies.

6.16 Conferences

SMDP will take part in regional and national conferences and will assist with hardware, software and guest speakers where appropriate.

6.17 BASIC

SMDP programmers will normally develop programs using a dialect of BASIC to simplify program transference from one system to another. This dialect will not necessarily be the lowest common denominator. It will be determined after consultation with other United Kingdom educational institutions. SMDP will issue details of this standard of BASIC, including special notes on graphics and file handling.

6.18 DOCUMENTATION

SMDP will set documentation standards for the upper level program library. These standards will involve sections directed at the pupil and the teacher and may include technical and classroom management notes.

Other Operational Matters

6.19 MAINTENANCE

First line repairs will be provided by SMDP technical support with second line repairs being handled through independent agencies. In special cases local maintenance may be agreed.

6.20 CONSUMABLES

Further consumables will not be allocated to Phase 1 centres unless a school or college has serious difficulties. Selected Phase 2 centres may have a further allocation of consumables in the 1980/81 financial year.

6.21 HARDWARE ALLOCATIONS

Further hardware will only be allocated to Phase 1 centres in order to rectify deficiencies or to improve system performance in the light of SMDP staff and advisers' reports. Further hardware may be allocated to selected Phase 2 development centres depending on the nature of the objectives. Hardware may be recalled if a project centre's circumstances become such that its agreed project falls below an acceptable level.

6.22 PROGRAMMER SUPPORT

The allocation of a programmer to a Phase 2 development centre or working group will not be a guarantee of permanent support. The support will be removed on completion of objectives or if an unsatisfactory situation arises at the centre or in the working group. Any centre given programming support will be required to provide accommodation and normal back-up services. (See Appendix 6)

7. **Implementation : Completed , Current and Proposed**

7.1 Promotion of general awareness

STRATEGY STATEMENT

To promote general awareness within SMDP Phase 1 and Phase 2 centres, SMDP will become involved in the co-ordination of working groups and in the presentation and dissemination of software and other educational material associated with, for example:

- *microcomputers as data base and information processors for general purpose and community use*
- *microcomputer simulations*
- *the use of microelectronics in industry and commerce*
- *the application of special purpose peripherals*
- *microelectronics control and recording devices*
- *microcomputer to microcomputer interfacing*

IMPLEMENTATION

The activities of working groups are closely associated with SMDP programming staff. The detail of the relationship between working groups and programming staff is given in Appendix 6.

Completed:

Three programmers have been allocated to working groups. These groups involve six schools, a college of education and a number of further education colleges. The subject areas include social studies, remedial work, the sciences and integrated school administration. Other programmers are in the process of being appointed.

General awareness has been promoted by the following activities:

- special presentations and software distributions to D01 prizewinners
- talks to schools and associations
- a seminar for businessmen
- publication of the SMDP periodical Phase Two
- familiarisation courses for HM Inspectorate
- presentation of SMDP and its work on tape/slide is available for loan to schools and colleges
- a slide collection for loan
- SMDP programmers to demonstrate a wide range of micros and peripherals to visitors

Current:

General awareness is being promoted by the following projects:
(See Appendix 2)

Project Nos: 1, 3, 6, 7, 13, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 28, 29, 33, 34, 35, 36, 39, 43, 44, 46, 48, 54, 67

Proposed:

As new programmers are appointed they will be trained by the existing staff, but the full complement will not be in post until September. Sample databases to be accessed by DBMS will be available from Easter 1981 for distribution to selected schools.

General awareness will be enhanced by the issue of occasional papers on certain aspects of microelectronics, such as interfacing and graphics.

7.2 Material for pre- and in-service teacher training courses

STRATEGY STATEMENT

SMDP will provide resources to back up teacher workshops and working groups at Regional and National level which are associated with Phase 1 and Phase 2 centres and will assist with the development and dissemination of appropriate pre- and in-service training modules. For example, SMDP will offer a loan service for software and hardware and provide programming support and information services. SMDP will also equip a van to give mobile support to in-service education and community awareness activities.

Success in the production of in-service course materials will largely depend upon the active co-operation of Regional resource centres and the colleges of education.

IMPLEMENTATION

Completed:

During January and February 1981 over 100 teachers and education administrative staff have had access to the microcomputer resources in the SMDP display area. New Scottish software to "teach yourself programming" has been tested with a considerable number of the above teachers and administrators. The SMDP van with its associated hardware has already been used extensively to distribute resources for in-service courses throughout Scotland.

Current:

Discussions are in train with DOI about a mobile exhibition to tour Scotland, possibly during summer 1981. A proposal for a joint project is currently being prepared by the Microelectronic Education Development Centre (MEDC) in association with SMDP. The title of this project is "Microelectronics in schools: aspects of instrumentation and control" and will involve the secondment of teachers.

Pre-service teacher education is reflected by the following projects:

Project Nos: 1, 17, 30 and 43.

In-service training is reflected by most of the SMDP projects through regional efforts and colleges of education. The following projects involve specific training elements:

Project Nos: 1, 2, 17, 30, 31, 41 and 43.

Proposed:

It is hoped that the colleges of education will become involved in the production of modular elements for in-service teacher training and that such elements will be distributed freely throughout Scotland to appropriate schools, colleges and Regional Authorities.

7.3 Computer Assisted Learning (CAL)

STRATEGY STATEMENT

SMDP will assist with the development, evaluation and distribution of CAL material associated with SMDP projects and will endeavour to acquire materials from commercial sources and from educational institutions including the former International Centre for the Use of Computers in Secondary Education. Assistance may take the form of access to CAL material, programming support, in-house facilities and information services.

IMPLEMENTATION

Completed:

Software from the former International Centre for the Use of Computers in Secondary Education is now held in SMDP. An arrangement has been agreed with the Minnesota Educational Computing Consortium (MECC) and their materials have been acquired. These packages are available for issue to appropriate working groups associated with Phase 1 and Phase 2 centres. Material from other sources, eg Fife, Hatfield, ILEA and GAPE, has also been acquired.

Current:

The International Centre software is now being examined and categorised. Over 100 "PET" programs have been through an initial technical evaluation and the reports are now held by the Information Officer.

Proposed:

A List of programs from the former International Centre, suitable for microcomputer applications, will be identified by June 1981. This material, where appropriate, will be passed to subject working groups selected from Phase 1 and Phase 2 centres at the start of the 1981/82 academic year. Distribution arrangements for materials will be completed by August 1981. Most SMDP projects involve CAL package production and evaluation and material should begin to flow into SMDP at the end of the current academic year.

7.4 Computer assisted assessment

STRATEGY STATEMENT

SMDP will give programming help to selected Phase 2 development centres and will assist them by supplying information and developed software.

IMPLEMENTATION

Completed:

It has been agreed to provide assistance (including programming support) to the Moray House College of Education project on Item Banking and some basic software has been ordered for the College. One element of the Jordanhill College of Education project was the mounting of a large marks processing package on a Cromemco. This package is now ready for school trials.

Current:

Assessment is reflected in the following SMDP projects:

Project Nos: 20, 30, 31, 37 and 41.

Proposed:

Programming support for the Moray House College of Education Item Banking project will be available by Easter 1981.

7.5 Microcomputer applications in industry and commerce

STRATEGY STATEMENT

SMDP will acquire packages including payroll, inventory, financial control and industrial and commercial simulations and will assist working groups to develop and distribute modules based on these packages.

IMPLEMENTATION

Completed:

SMDP has had discussions with interested parties regarding possible extra staff to concentrate on industrial liaison.

Current:

Projects associated with industrial and commercial application packages include:

Project Nos: 1, 16, 19, 20, 22, 23, 30, 31, 37, 39, 40, 44, 47, 50, 61, 62, 64 and 66.

Proposed:

SMDP will acquire two software packages in the current financial year for initial evaluation and will distribute them to a college of further education selected from the Phase 1 list of project centres. Relevant packages currently held include VISICALC, DBMS and WORDSTAR.

7.6 Microelectronics for special education

STRATEGY STATEMENT

SMDP will assist in setting up a small working group of specialist teachers and advisers associated with the teaching of pupils with sensory loss. Programming assistance will be provided and, where appropriate, commercial software. Outside agencies will be encouraged to support the working group which will be publicised by the information service.

IMPLEMENTATION

Completed:

Mr P Odor of the Department of Education and Dr J Howe of the Department of Artificial Intelligence, from Edinburgh University have been invited to form a small working group to bring together personnel working on SMDP projects in this field.

Current:

Projects involving special education include:

Project Nos: 14, 18, 32, 51 and 55.

7.7 School and post-school management

STRATEGY STATEMENT

SMDP will support and publicise the Secondary Schools Computer Administration and Management Project (SCAMP) as the principal school administration project in Scotland and give regular publicity to applications in school management. A group will be formed to evaluate DBMS, word processing and file handling techniques. SMDP will continue to support and co-ordinate the other Phase 1 administration projects.

IMPLEMENTATION

Completed:

SMDP is now formally represented on the Steering Committee of SCAMP, the title of which is now officially "SCAMP, in association with SMDP". Programming support has been allocated to this project.

Current:

The evaluation of DBMS and word processing is currently being carried out by SMDP project centres.

School/post school management is reflected in the following SMDP projects:

Project Nos: 20, 30, 31, 37, 40, 41, 47 and 50.

7.8 Community education and awareness

STRATEGY STATEMENT

SMDP in association with other interested parties will develop and promote general interest courses for the community.

IMPLEMENTATION

Completed:

SMDP has been involved in the setting up of the Scottish Community Education Microelectronics Project (SCEMP) and has acted as its purchasing agent. (See Appendix 4)

Current:

SMDP have a place on the Steering Committee for SCEMP.

Proposed:

SCEMP staff will soon be appointed through SMDP and there will be flexible interchange of staff between the two organisations.

7.9 Industrial Liaison

STRATEGY STATEMENT

SMDP will be involved in joint industrial projects carried out in co-operation with MEDC at Paisley and others. The Programme will concentrate on the use of microelectronics systems in commercial and industrial applications and their use in staff training. Joint projects may include seminars, hardware evaluation, workshops, software design, simulations, industry in-house courses open to teachers, industry-funded liaison officers and programmers.

IMPLEMENTATION

Current:

A joint project is currently being devised with MEDC entitled "Microelectronics in schools: aspects of instrumentation and control".

Proposed:

Further involvement in industrial projects cannot be undertaken until extra manpower is provided. Co-operation between MEDC and SMDP will continue and projects currently at a planning stage will be processed.

7.10 Dissemination, collection and exchange of general information

STRATEGY STATEMENT

An information service largely for SMDP Phase 1 and Phase 2 centres will be provided by SMDP through the activities of the Information Officer and other SMDP staff where appropriate. Enquiries will be handled by post, telephone and personal visits and will involve technical and educational information on hardware, software and educational support material. The service will acquire and disseminate information from the United Kingdom and abroad. SMDP will participate in an appropriate United Kingdom information network.

IMPLEMENTATION

Completed:

The SMDP information service became operational in February 1981 and will develop as the Programme progresses. SMDP has acquired the necessary hardware to enable it to participate in a UK information network.

Proposed:

The first SMDP package list will be issued in June 1981. Information from the UK network and elsewhere will be available to Regional resource centres and colleges of education through the SCET data bank.

7.11 Software from project sources

STRATEGY STATEMENT

All software packages developed at Phase 1 and Phase 2 centres will be collected and housed in the software library. The material will be tested and evaluated by other centres or working groups. All such material will be on open access within Scottish education. The principle that software generated in Scotland should be free to Scottish schools and colleges has been confirmed by the Convention of Scottish Local Authorities (COSLA). The only costs or parts thereof which should be passed on will be those associated with the production and distribution of documentation and storage media.

IMPLEMENTATION

Completed:

There was a call for software in Phase Two in February 1981, with the result that a number of packages are now being processed.

Proposed:

It is anticipated that software from Phase 1 and Phase 2 centres will start to arrive at SMDP by June 1981 and that distribution of such software through Regional resource centres and selected colleges will commence during the 1981/82 academic year.

7.12 Software from other sources

STRATEGY STATEMENT

Where SMDP has incurred costs in acquiring software, such costs may have to be passed in whole or in part to a receiving centre.

IMPLEMENTATION

Completed:

Materials have been acquired from MECC, Fife, Hatfield, ILEA and GAPE.

Proposed:

Further purchases of software will be made each year and costs to be passed on to users will depend on the conditions attached to the purchase.

6.13 Software Library

STRATEGY STATEMENT

SMDP will establish a central library of software. This library will include two basic software levels. The upper level will consist of packages considered to be educationally valuable, adequately documented and technically competent. These programs will be maintained by SMDP in association with the program authors. The lower level library will consist of contributed programs for which no guarantee will be given. Some lower level packages, after evaluation by a subject group, may be selected for further development with a view to inclusion in the upper level. Both library levels may include software which has incurred acquisition or other costs.

IMPLEMENTATION

Completed:

Meetings have been held with the colleges of education computer staff and other agencies to discuss the setting-up of a software library service.

Proposed:

The proposed operation of the Library service is detailed in Appendix 1. It is recognised that the colleges of education and other agencies

have for some time maintained libraries of software for computer applications. The active co-operation of these establishments will be sought to develop a Scottish software service. A direct link between a college of education and SMDP may be set up in order to enhance the UK information network. The time scale for such a link-up is outwith SMDP control. With the co-operation promised from these establishments it is anticipated that a service will be available to schools early in the 1981/82 academic year.

The other essential agencies for an effective software library service are the Regional resource centres. The COSLA agreement regarding the exchange of software throughout Scottish education indicates the commitment of the Regions to a library service.

7.14 Display area

STRATEGY STATEMENT

The SMDP display area will serve two functions; it will provide work-stations for the programmers and a display area for visitors. It will show, among others, the microcomputers currently associated with the projects and will also include a number of the peripherals currently being used in education. A small area will be set aside for physics and engineering control techniques. Anyone from schools, colleges, industry or elsewhere, interested in seeing the display area will be able to telephone to make an appointment.

IMPLEMENTATION

Completed:

During January and February 1981 there have been approximately 350 visitors to the display area and it has been used for 8 courses/seminars.

Proposed:

It is anticipated that such use of the display area will grow steadily.

7.15 SMDP periodical (Phase Two)

STRATEGY STATEMENT

Phase Two will be the quarterly periodical of SMDP and will include profiles of projects and project centres. It will also carry items of general interest to those involved in educational computing in Scotland. Space in the periodical may be offered to other interested parties. The periodical will be on subscription but project centres will receive free copies.

IMPLEMENTATION

Completed:

The first issue of Phase Two was published on the 2nd February 1981. 2000 copies were produced for free distribution to educationists and appropriate institutions.

Proposed:

Occasional publications, including bulletins, will be issued as resources permit on such topics as graphics, interfacing and control.

7.16 Conferences

STRATEGY STATEMENT

SMDP will take part in Regional and National conferences and will assist with hardware, software and guest speakers where appropriate.

IMPLEMENTATION

Completed:

SMDP has hosted 12 conferences since January 1981.

Proposed:

SMDP is taking part in a further six conferences, namely ETIC 81, SCEG, the national conference of the Association for Science Education at Callendar Park College of Education, a microprocessor workshop for the medical profession, in-house workshops for SCET and a new technology course for the police authorities. The future degree of involvement with respect to conferences will be determined by the limited SMDP staffing resources.

Operational Standards

7.17 BASIC

STRATEGY STATEMENT

SMDP programmers will normally develop programs using a dialect of BASIC to simplify program transference from one system to another. This dialect will not necessarily be the lowest common denominator. It will be determined after consultation with other United Kingdom educational institutions. SMDP will issue details of this standard of BASIC, including special notes on graphics and file handling.

IMPLEMENTATION

Completed:

Discussions have been held on standard BASIC with MEP, CET, NCC, the Birmingham Education Computer Centre, Hatfield Polytechnic and ILEA.

Proposed:

A standard form of BASIC will be recommended to SMDP project centres within the current academic year.

7.18 DOCUMENTATION

STRATEGY STATEMENT

SMDP will set documentation standards for the upper level program library. These standards will involve sections directed at the pupil and the teacher and may include technical and classroom management notes.

IMPLEMENTATION

Proposed:

Recommended documentation standards for the upper level library will be issued within the current academic year.

SMDP Information Service

Objectives

In support of SMDP operations, the objectives of the information service will be to:

1. establish and maintain an information base, primarily to support Phase 1 and Phase 2 projects and will include
 - software
 - specifications of hardware and interfacing
 - curriculum and resource materials
 - books, reports and magazines
 - audio-visual materials;
2. develop, from these
 - a software library
 - an efficient enquiry service primarily in support of Phase 1 and Phase 2 centres;
3. develop systems for disseminating information to all schools, colleges and educational institutions in Scotland and to other organisations, as appropriate, in co-operation with Regional resource centres and selected colleges;
4. to develop communications amongst the Phase 1 and Phase 2 development centres and SMDP;
5. encourage information and software exchange within Scotland, the UK and on an international basis in co-operation with Regional resource centres and selected colleges.

IMPLEMENTATION

This section expands upon the procedures necessary to realise the objectives. The procedure for the establishment of a software collection and library will include:

- keeping available at least one spare copy of every program
- calculating a scale of charges
- preparing standard order forms and copyright clearance agreements

Requests for copies would be made on a standard form and would incur standard costs for materials. Authors of programs submitted would sign an agreement to empower SMDP to copy and distribute their programs.

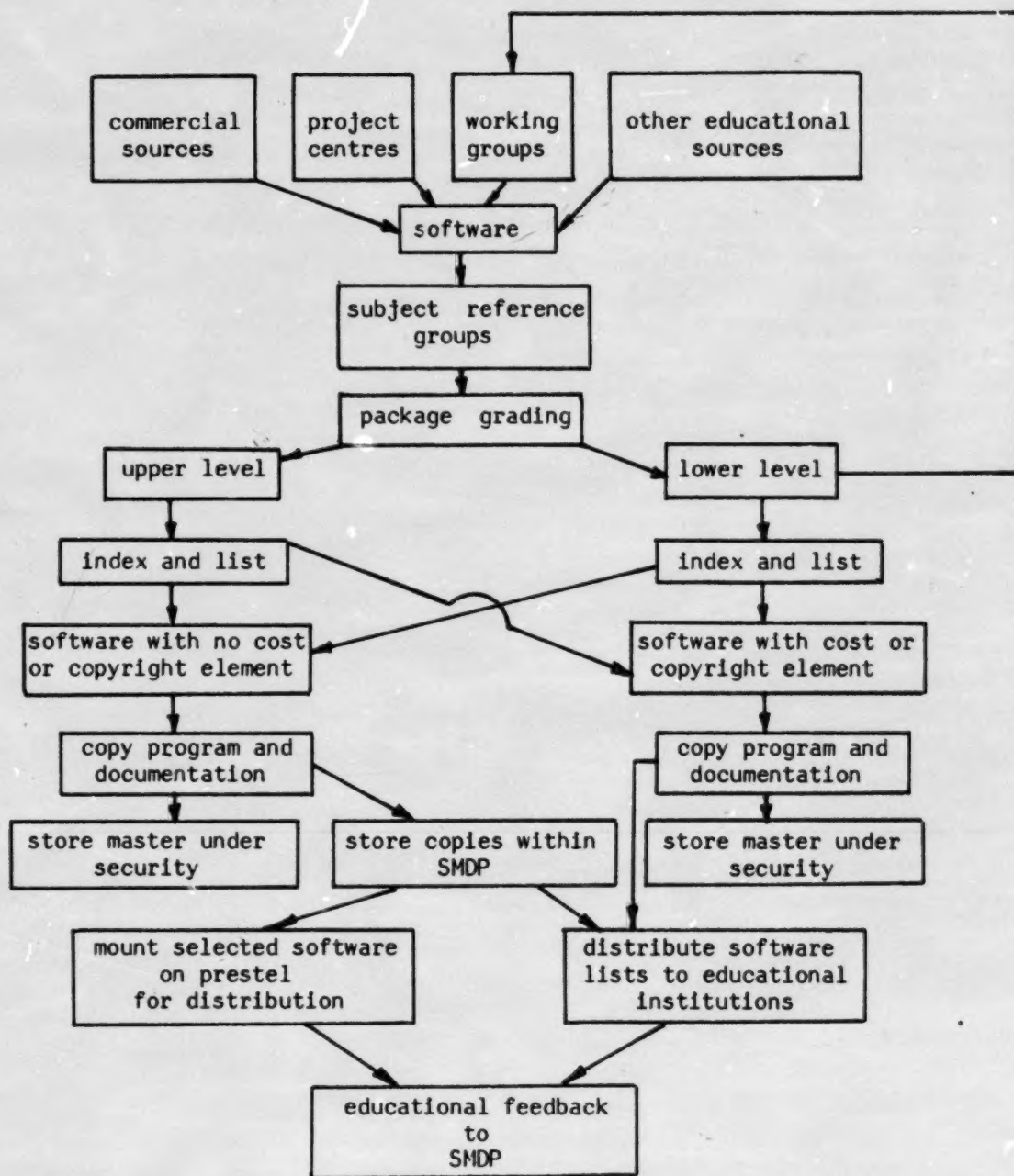
PRIORITIES

- information staff training (especially hardware and microelectronics applications); to be completed within the current academic year
- list software held at SMDP and keep updated
- negotiate with Regions to arrange dissemination of information; to be completed within the current academic year
- circulate bulletin when available
- make preliminary contact with project centres
- enhance book and periodicals library
- maintain contact with suppliers and manufacturers
- maintain contact with software agencies within UK
- maintain contact with international software agencies

In addition, a number of activities will be continuous:

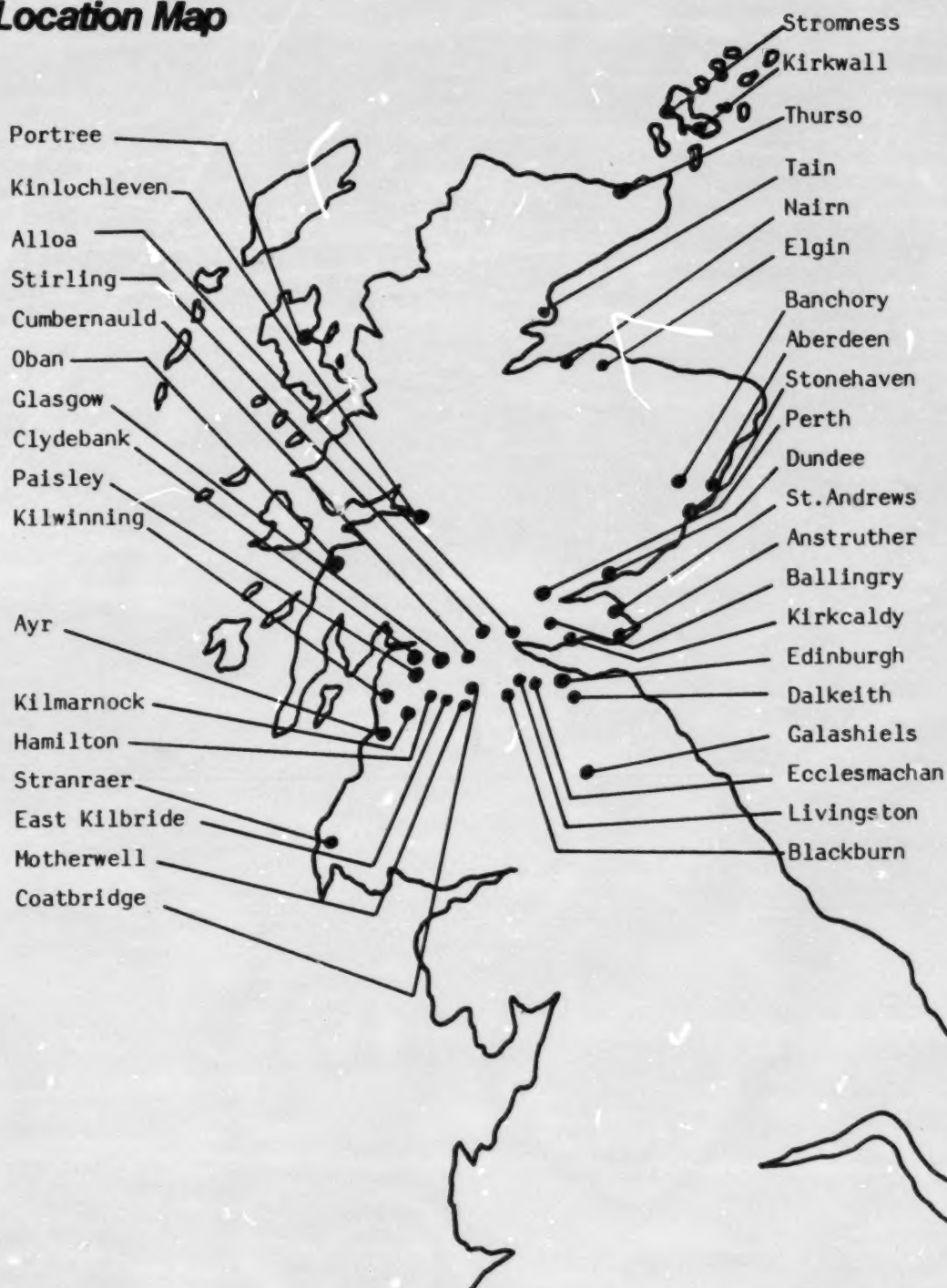
- answering enquiries
- reading incoming information
- building up collections of information and resource materials
- display
- visits
- office administration and liaison
- organisation of courses.

Software Library Schedule



List of SMDP Projects

Location Map



<u>Project Ref.No.</u>	<u>Institution</u>	<u>Project Leader</u>	<u>Project System</u>	<u>Subjects</u>
1	Aberdeen College of Education (in associ- ation with Grampian Reg)	N M Smart D Houston	CROMEMCO 2	Mathematics, physics, technical subjects, geography, business studies, home economics
	Associated Project Centres:			
	Banchory Academy Banchory			Programs written for simple harmonic motion, Boyle's Law, alternating current theory. These programs have been written to exploit the use of separate colours to pick out different variables.
	Mackie Academy Stonehaven			Technical subject packages are being developed, including centroids and centres of gravity using a graphics approach.
2	King's College University of Aberdeen	R McAleese	PET	Remedial education
3	Abrornhill High School Cumbernauld	D Dunsmuir	CROMEMCO 2	Geography, science. Project now expanded to include physics, chemistry, biology, mathematics and business studies. The school intends to extend further to include remedial education, computer studies, microelectronics and assessment procedures.
4	Ballingry Jnr High School Lochgelly, Fife	D A McNeill	PET	Microcomputers in the curriculum. Particular attention is being paid to the use of microcomputers to stimulate interest in arithmetic and English.

5	Barrhead High School Barrhead	J Goldin	CROMEMCO 2	Mathematics. Pupils are now preparing programs in mathematics, science, geography and business studies. The school has also converted previous mini- and main-frame material.
6	Bell College of Technology, Hamilton	A D Blair	AIMS & KIMS	Engineering interfacing
7	Bishopbriggs High School Bishopbriggs	E Forrester	CROMEMCO 2	Science and mathematics. Programs are available for a first and second year integrated science course, used in conjunction with published worksheets. The school is now proposing to produce packages on rectification, capacitor charge and discharge and Lenz's Law.
8	Bonaly Primary School Edinburgh	M McKenzie	PET	Evaluation of use in primary education. The school has decided to specialise in mathematics for primary schools. There is a possibility that B Ed students may become involved in programming for the school.
9	Castlebrae High School Edinburgh	K Thomson	MICRO NOVA	Social subjects. The school has converted a large number of 380Z programs to run on their new machine.
10	Clydebank Technical College, Clydebank	J McKerrow	CROMEMCO 2	Computing in the sciences. The college is in the process of mounting the engineering packages (both mechanical and electrical) written by the Scottish Computer Education Group working parties.
11	Coatbridge High School Coatbridge	J G Forsyth	CROMEMCO 2	Mathematics

12	Craiglockhart College of Education, Edinburgh	M Clarke	TERAK	Mathematics. The LOGO system has been used with students who have experienced difficulties in mathematics. The topics of shape and number are being studied.
13	Daniel Stewart's & Melville College Edinburgh	D McDiarmid	SOUTH WEST TECHNICAL 6800	Mathematics, chemistry, biology, physics. Further work is now being done on computer studies, statistical simulations and school administration.
14	Donaldson's School for the Deaf Edinburgh	J Miller	SOUTH WEST TECHNICAL 6800	Multi-factor approach to language training for deaf children. The school is also evaluating the use of a Texas microcomputer for suitability in the teaching of the deaf.
15	Duncanrig High School East Kilbride	D L Cook	CROMEMCO 2	Modern studies. Preliminary investigations have been undertaken with a view to producing a simplified simulation of a national economy
16	Dundee College of Commerce	M C Brown	FORTRONICS WORD PROCESSOR	Business studies
17	Dundee College of Education	J Ewing, W Dow A McMeeken	PET & APPLE II	Physics, biology, mathematics for less able, primary
18	University of Edinburgh Godfrey Thomson Unit for Educational Research	S A Sharp	APPLE II	Communication and control aids for handicapped children. Initial programs have been developed for severely handicapped children employing voice recognition techniques.
19	Fisk Valley College Dalkeith	R B Buchan	CROMEMCO 3	Business studies
20	Forrester High School Edinburgh	E Smith	FORTRONICS WORD PROCESSOR	Business studies. Areas of investigation include guidance record keeping, information on staff in-service training, class lists, standard letters, school publications and criterion reference testing.

21	Galashiels Academy Galashiels	J Birrell	SOUTH WEST TECH- NICAL 6800	Special education, awareness. Programs written to date include basic arithmetic, spelling, sentence completion and the encouragement of reading. Investigative work has also been under-taken into the use of the Text Editor to retrieve information for school administration.
22	Glasgow College of Building & Printing	P F Ryan	PET	Building contracts, price fluctuations.
23	Glasgow College of Technology	N Meadows	WANG WORD PROCESSOR	Business administration.
24	University of Glasgow	A Johnstone	APPLE II	Chemistry. Currently translating and updating the Energy Game and population study for foundation pupils. The University intends to turn its attention to chemistry, physics and biology soon. They have also taken the format of the Animal Game and applied it to the periodic table.
25	Glenwood Secondary School, Glasgow	F Gisbey	CROMEMCO 2	Chemistry. The school has mounted converted main-frame programs and is currently preparing packages on halflife and magnesium hydrochloric acid rates of reaction.
26	Govan High School Glasgow	E McLauchlan	CROMEMCO 2	Social subjects. Now using the microcomputer in modern studies, business studies, physics, accounting and secretarial studies.
27	Gracemount Primary School, Edinburgh	C D Mallison	PET	Evaluation of use in primary education. Specialising in arithmetic skills, environmental studies and the development of logic skills. A neighbouring school and a local college are giving assistance.
28	Grange Academy Kilmarnock	D Matheson	CROMEMCO 2	Biology and physics. The school has developed a program to randomly generate problems in Ohm's Law. A Millikan Oil-drop Experiment simulation has also been developed.

29	Hunter High School East Kilbride	A Thomson	CROMEMCO 2	Mathematics, music, interfacing. The school has successfully interfaced a programmable sound generator chip to their Cromemco. The school is building a model railway layout to be interfaced and controlled by their Cromemco. The railway layout is designed to enable the system to be transported to other schools.
30	Jordanhill College of Education, Glasgow	D Dougal A J Fyfe	CROMEMCO 2	Teacher education. A suite of 6 programs have now been written to enable the Cromemco to perform marks processing. The programs and associated manuals are being evaluated in 3 pilot schools. Work is soon to start on a program involving statistical analysis of assessment data.
31	Jordanhill School of Further Education, Glasgow	I S Smith	CROMEMCO 2 & PET	In-service teacher training. New working groups have recently been set up in chemistry, nursing and further education administration.
32	Kaimes Special School Edinburgh	J Ruddick & M Henderson	PET	Curriculum work involving partially sighted pupils.
33	Kilmarnock Technical College, Kilmarnock	J M Miller	APPLE II	Engineering.
34	Kingsway Technical College, Dundee	J Nooney	PET & INTERFACING EQUIPMENT	Engineering, interfacing and control. The first of 5 projects has been completed.
35	Kinlochleven Junior Secondary School Kinlochleven	W McEwan	COMPU-KIT	Interfacing via the mains circuit.
36	Kirkcaldy College of Technology, Kirkcaldy	E Parkinson	ADDITIONS TO EXISTING APPLE SYSTEMS	Mechanical and production engineering.
37	Kirkcaldy High School Kirkcaldy	C Tomasso	DACOLL DEMOCRAT	Integrated school administration, SCAMP (see Appendix 3).

38	Kirkwall Grammar School Kirkwall	D Mainland	PET	Mathematics. Also involved with 5th year computer studies classes and school administration. The school administration programs include school file, subject options, timetabling, teacher availability and school funds.
39	Lornhill Academy Alloa	Mr Paterson	CROMEMCO 2	Business studies. A substantial program has been written to produce final accounts covering aspects of the O grade syllabus. Other accounting programs are under way. Work has also been done on the solution of linear equations of two variables.
40	Moray College of Further Education, Elgin	C G Reid	CROMEMCO 2	Administration and evaluation. This college is evaluating the use of a hard disc for administration. Extensive use has been made of data base handling systems.
41	Moray House College of Education, Edinburgh	P J Barker	MICRO-NOVA	Assessment, careers guidance.
42	Motherwell Technical College, Motherwell	J Nicol	APPLE II	Special needs. Work has been done on programs for students with varying disabilities, involving speech and hearing difficulties. Such programs cover arithmetic, consonants and social vocabulary. The college is also using a program to help students with eye scanning problems.
43	Notre Dame College of Education, Glasgow	R A Sparks	APPLE II	Physics.
44	Oatridge Agricultural College, Broxburn	L Coutts	SOUTH WEST TECH- NICAL 6800	Farm management
45	Oban High School Oban	W Davidson	CROMEMCO 2	Mathematics. The microcomputer is also being used with geography, biology and economics classes. Numerical analysis and stock control programs have been written in Fortran.

46	Paisley College of Technology, Paisley	R R Burnside	ADDITIONS TO EX- ISTING SYSTEMS	Industrial studies, business studies, career guidance.
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Associated Project Centres:

Carron Grange Teachers' Centre
Stenhousemuir

Whitehill Secondary School
Glasgow

Larkhall Academy
Gallowhill, Larkhall

Garnock Academy
Kilbirnie

Craigshill High School
Livingstone

St Kentigern's Academy
Blackburn

Nairn Academy
Nairn

47	Perth College of Further Education, Perth	J Gardner	PET & CROMEMCO 3	Resource centre for administration and curriculum.
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48	Portobello High School Edinburgh	J Jamieson	PET	Physics. The computer is being used to operate and record data from experimental equipment. Parameters being measured include voltage, current, resistance, time, frequency and temperature.
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49	Portree High School Portree	R R Siwek	PET & CROMEMCO 2	Resource centre/secondary/primary
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50	Rockwell High School Dundee	J J Whyte	CROMEMCO 2	Management. Programs developed include file listing, file initialisation, class cover, record creation and adjustment.
51	Royal Blind School Edinburgh	W Aitken	VERSABRAILLE	
52	University of St Andrews St Andrews	A J Cole	CROMEMCO 2	S Algol applications in schools.
Associated Project Centres:				
	Madras College St Andrews			Work is being carried out in maths, geography and engineering science. 23 projects are currently being considered by pupils as part of their 6th year studies.
	Waid Academy Anstruther			The interfacing of the microcomputer to physics and its application to mathematical topics. Work is also being done on pupil diet.
53	St Augustines High School, Edinburgh	E Murdoch	PET	Mathematics
54	St Michaels Academy Kilwinning	J A Pentleton	CROMEMCO 2	Physics and chemistry. This school has been looking at ways of utilising the Cromemco in physics within the limitation of having no high resolution graphics. A physics package on radio-active halflife has been written and tested. This school will shortly evaluate the use of high resolution graphics recently supplied.
55	St Vincents School Glasgow	A McGill	OPTACON	Evaluation of Optacon with blind pupils.

56	SCDS Dundee Centre Dundee	J Hughes	MICRO-KITS/ COMPU-KITS	Engineering and physics. Working groups are involved with logic systems, physics courses and engineering science. The Centre has distributed the equipment to 6 secondary schools.
57	SCET Glasgow	D Daly	PRESTEL	Prestel in education
	Associated Project Centres:			
	Dean Education Centre Edinburgh			
	Craigroyston High School Edinburgh			
	Woodland Teacher Centre Glasgow			
	Clydebank High School Clydebank			
	St Andrews R C High School Clydebank			
58	SSSERC Edinburgh	J Stewart	PET	Evaluation for science. SSSERC is the Scottish Schools Science Equipment Research Centre. The Centre has been evaluating the PET system with respect to the measurement of time, velocity and acceleration associated with Newton's Law experiments using trolley and runway. The Centre has also evaluated the equipment in the calibrating of a signal generator.
59	The High School of Stirling, Stirling	Messrs Thomson CROMEMCO 2 & Seaton		Computer studies and science. Work is being done on a linear motion package. The program is running but awaits evaluation.

60	Stranraer Academy Stranraer	B McNaught	PET	Computer studies, mathematics. This school is evaluating the use of word processing in the curriculum.
61	Stromness Academy Stromness, Orkney	R McKenzie	PET	Business studies
62	Tain Royal Academy	W Napier	APPLE 11	Mathematics, business studies. Programs are in preparation on geometry and dynamics. The microcomputer is also being used for careers guidance.
63	Telford College of Further Education Edinburgh	T Davies	CROMEMCO 2	SCOTBEC/SCOTEC Courses
64	Thurso Technical College Thurso	H Henderson	SOUTH WEST TECH- NICAL 6800	Business studies
65	Wallace High School Stirling	Mr Wilson	CROMEMCO 2	Mathematics. Packages have been developed in mathematics, electricity billing, wages, shopping lists and dice simulation.
66	West of Scotland Agricultural College Auchincruive, Ayr	D Mainland	SOUTH WEST TECH- NICAL 6800	Farm management
67	Wester Hailes Education Centre Edinburgh	K Robertson	APPLE II	Computer studies. Packages have been developed for mathematics, biology, physics, chemistry, remedial, modern studies and home economics.
68	Whitehill Secondary School, Glasgow	A Smith	CROMEMCO 2	Mathematics and physics. The following programs are being prepared by this school: the Welfare State, and Balance of Payments for Modern Studies, Climate Statistics and Beta Index for Geography, Balancing of Accounts and the Two-column Cash Book.

Schools Computer Administration and Management Project

(SCAMP)

In 1977, Central Region, Fife Region and the Scottish Education Department agreed to co-operate in a project entitled Secondary Schools Computer Administration and Management Project (SCAMP) which began in early 1978.

The Project is intended to consider all aspects of secondary school administration including the details of pupils and teaching staff necessary for the administration of the school and the information required by the authority on the school organisation. However, a decision was taken at the outset to concentrate upon establishing computer files on pupils from which could be derived class lists, option choices, age listings, marks standardisation and factual details such as disabilities and emergency contacts. The second phase of the project will consider information concerning teaching staff such as the form of teaching load, subject proportionality and class size.

The two Regional Authorities have co-operated in specifying the overall system and in the compilation of records. There is, however, a difference in approach since Central Region has adopted a terminal system on line to the main frame computer at Falkirk College of Technology while Fife Region is developing a method of using school-based microcomputer systems with a view to allowing either one school or a group of schools to do much of their own processing.

The project is directed by a steering committee comprising representatives of the two Regions, SMDP and the Scottish Education Department, but the detailed development work is in the hands of a project team. This team consists of a Systems Analyst, two computer experts and two assistant headteachers. Numerous schools in the Regions were consulted before details of the project were agreed. Currently two secondary schools, with the full co-operation of their local primaries, are testing the materials and it is intended that other schools within the Regions will gradually come into the system.

SCAMP recently received a considerable amount of hardware from SMDP and this accords with the SED's view that it is a project of major importance and one which could well point the way ahead for school administration for many years.

The Scottish Community Education Microelectronics Project

(SCEMP)

Within the field of community education two areas in which microcomputers can have a major impact have been identified:

- information storage and retrieval
- the provision of programmed learning opportunities for individuals and groups.

One of the difficulties of any enquiry service lies in the lengthy and tedious business of checking through files for appropriate information and the corresponding difficulties of maintaining up to date records. The use of computers to ease this burden and ensure a more effective updating system and search of the files is an obvious one. The ability to respond instantly to a query is one which operators of information services have been seeking for a long time and would be particularly fruitful in the case of telephone enquiries where time spent waiting is costly.

In the area of programmed learning, many programs have been developed but mostly for schools and colleges. Very little work has been done in the development of programs useful to individuals and groups in an informal or community setting. There are several ways in which such facilities could be used and the following suggestions are illustrative rather than definitive:

- Personal problem solving
- Child development and education
- Home information systems and wordprocessing
- Community councils and local organisations
- Library and jobfinding data banks
- Demonstrations for small companies and individuals
- Educational and recreational activities

Six sets of microcomputer equipment have been purchased and will be deployed in a variety of ways. While the exact sites and uses of the equipment have yet to be determined the two broad principles have been agreed.

Monitoring and Evaluation of Projects

Evaluation of the Programme is a continuing process, built in from its inception and carried out by several groups :

- in-house SMDP monitoring, through all team members
- project assessors, whose task is to oversee and guide the formulation of objectives for individual projects
- SED personnel, concentrating on educational issues in the schools
- a longitudinal independent evaluation carried out by the staff of Edinburgh University, Department of Education.

Evaluation is seen as a means of closing the loop of design/test/redesign, and aims to serve the projects it evaluates. To achieve this, information will be collected and disseminated. There are several questions to be addressed

- in which areas of educational need do microelectronic devices have a genuine role ?
- how effective are the materials which are being developed to meet these needs ?
- how effective are commercially available materials ?
- what are the major problems in providing these materials ?
- are the materials easily transferable, both across teaching style and across machines and what problems arise in transfer ?
- what are the appropriate modes of liaison with industry ?
- what should be offered in pre- and in-service teacher training courses to ensure that good use is made of available materials and to stimulate the production of new materials ?
- what are the appropriate levels of provision for microcomputer hardware, software and other materials, Central and Regional support services, and teacher training ?
- what are the current shortfalls in provision ?

The evaluation team is developing methods of self and cross monitoring for projects together with overall surveys where appropriate.

Programmer's Involvement with Working Groups

The allocation of a programmer to a Phase 2 development centre or working group will not be a guarantee of permanent support. Such support would be removed if an unsatisfactory situation arose at a centre or working group. Any centre awarded programming support would be required to provide accommodation and normal back-up services.

During the first few meetings of a working group the programmer will be supported by a senior member of the SMDP staff. It is anticipated that, through the programmer, SMDP will supply the working group with samples of software to set an initial standard. The working group will then have the responsibility of testing and evaluating both the program and the educational back-up material associated with such packages. The working group will modify the educational material associated with the package, the programmer being responsible for any alterations to the program listing.

Programmers will be expected to divide their time between at least two centres in case of staff changes.

It is important that a time limit of up to three months is placed on the evaluation of any package being considered by the working group. It is unlikely that a programmer will be actively engaged in programming work during all of this period. When not working with the group the programmer will be involved in SMDP in-house work.

Programmer Actions and Interactions

